FIG. 1 (PRIOR ART)

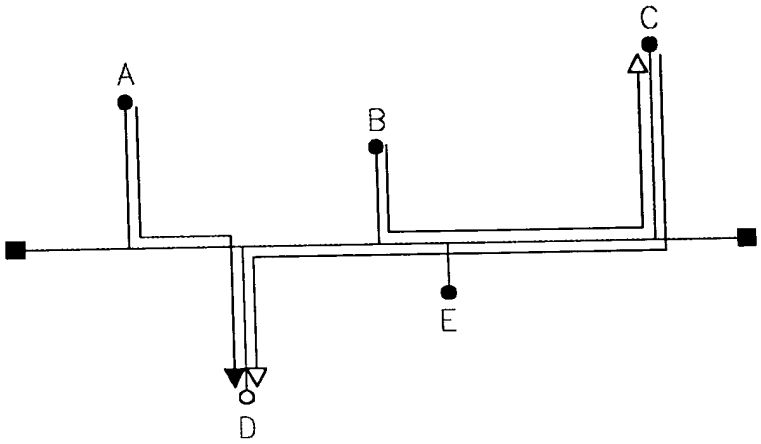


FIG. 2 (PRIOR ART)

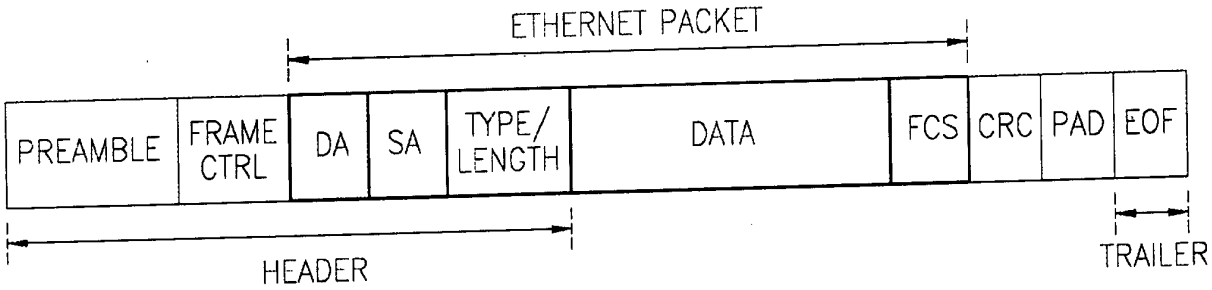


FIG. 3

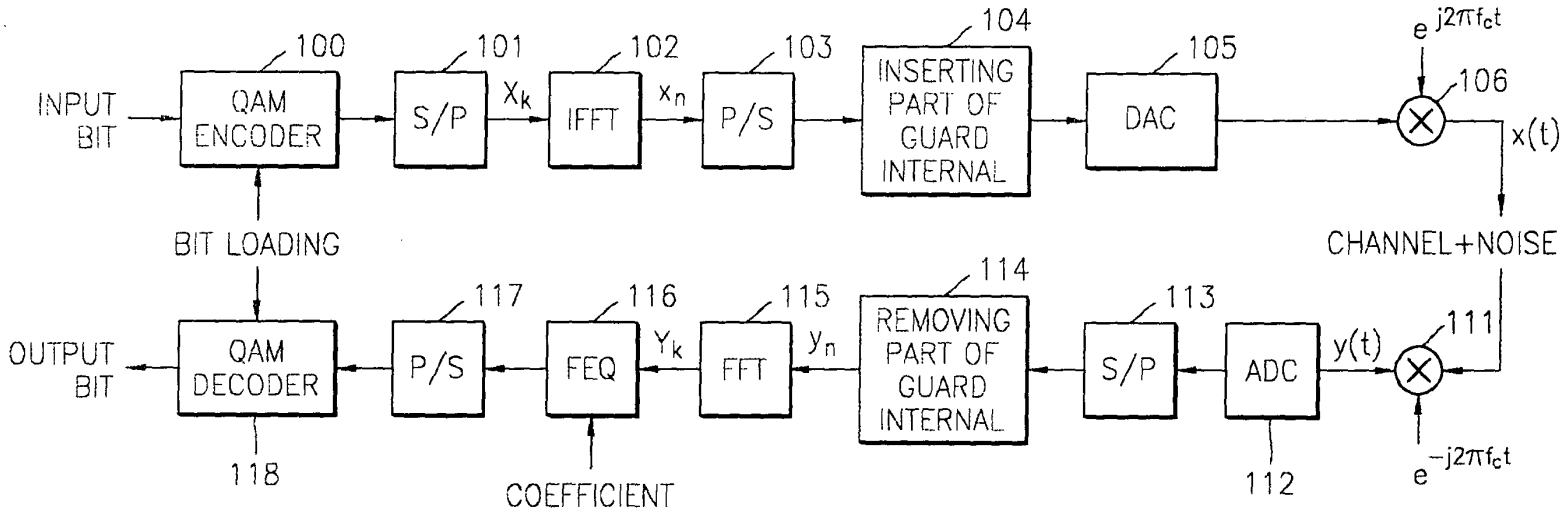

INPUT BIT
QAM ENCODER
100
S/P
101
$X_k$
IFFT
102
$x_n$
P/S
103
INSERTING PART OF GUARD INTERNAL
104
DAC
105
$e^{j2\pi f_c t}$
106
x(t)
CHANNEL+NOISE
BIT LOADING
OUTPUT BIT
QAM DECODER
118
P/S
117
FEQ
116
$Y_k$
COEFFICIENT
FFT
115
$y_n$
REMOVING PART OF GUARD INTERNAL
114
S/P
113
ADC
112
y(t)
111
$e^{-j2\pi f_c t}$

FIG. 4

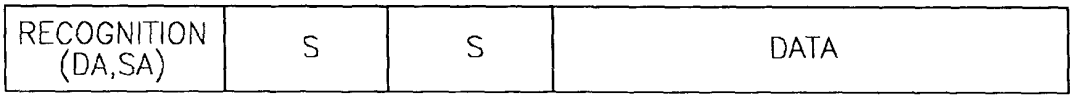



FIG. 5

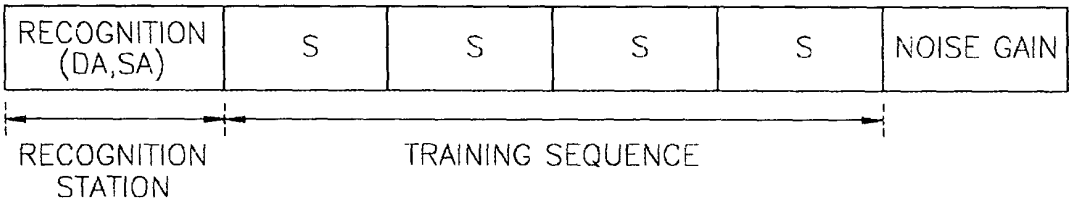



FIG. 6

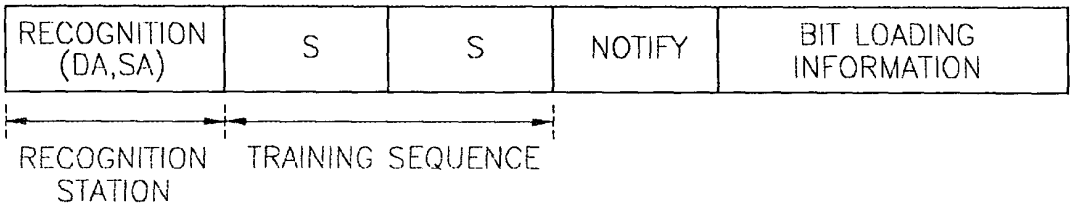


FIG. 7

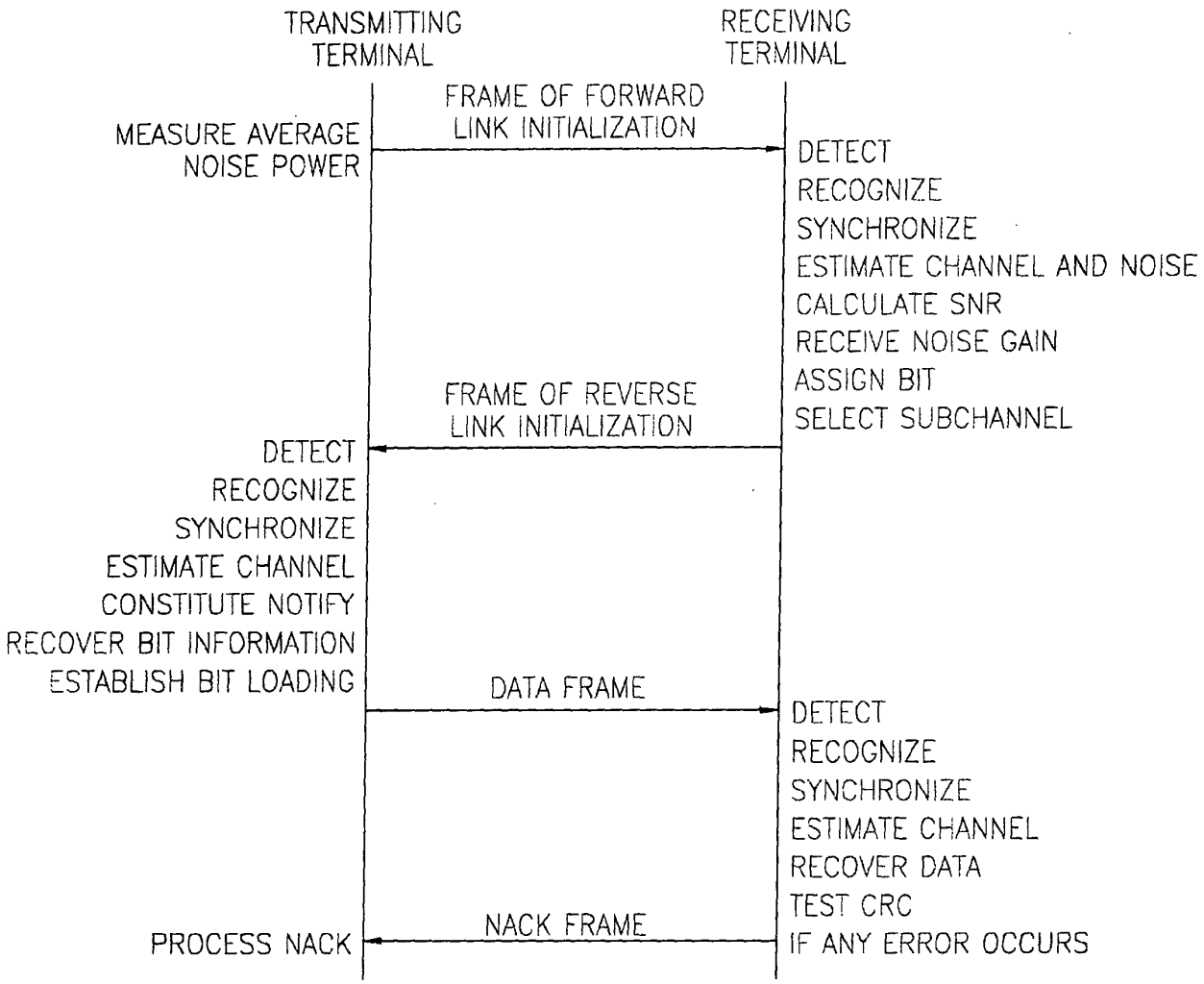

TRANSMITTING TERMINAL
RECEIVING TERMINAL
FRAME OF FORWARD LINK INITIALIZATION
MEASURE AVERAGE NOISE POWER
DETECT
RECOGNIZE
SYNCHRONIZE
ESTIMATE CHANNEL AND NOISE
CALCULATE SNR
RECEIVE NOISE GAIN
ASSIGN BIT
SELECT SUBCHANNEL
FRAME OF REVERSE LINK INITIALIZATION
DETECT
RECOGNIZE
SYNCHRONIZE
ESTIMATE CHANNEL
CONSTITUTE NOTIFY
RECOVER BIT INFORMATION
ESTABLISH BIT LOADING
DATA FRAME
DETECT
RECOGNIZE
SYNCHRONIZE
ESTIMATE CHANNEL
RECOVER DATA
TEST CRC
NACK FRAME
PROCESS NACK
IF ANY ERROR OCCURS

FIG. 8

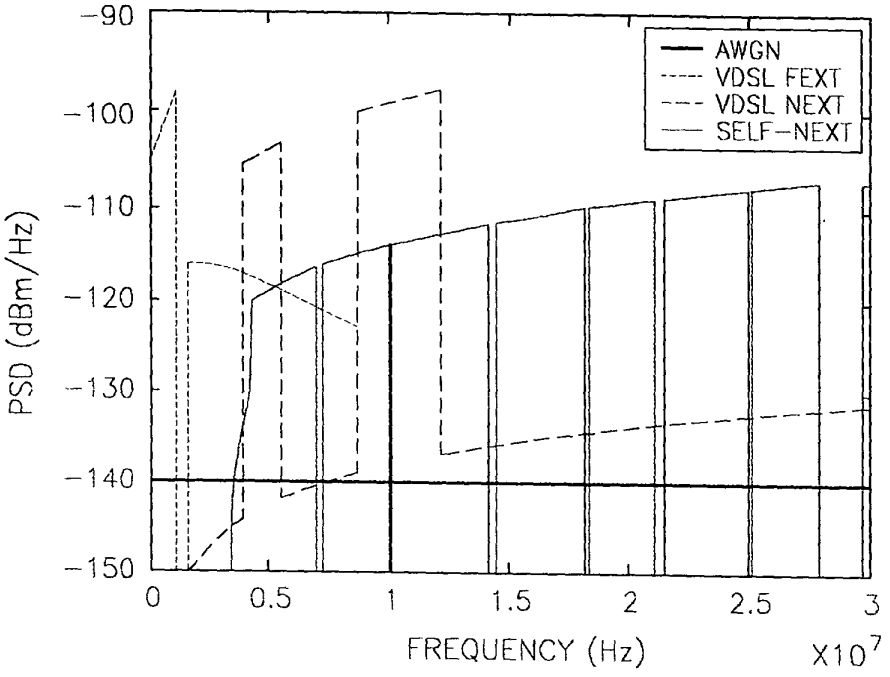

AWGN
VDSL FEXT
VDSL NEXT
SELF-NEXT
PSD (dBm/Hz)
-90
-100
-110
-120
-130
-140
-150
0
0.5
1
1.5
2
2.5
3
FREQUENCY (Hz)
X10^7

FIG. 9

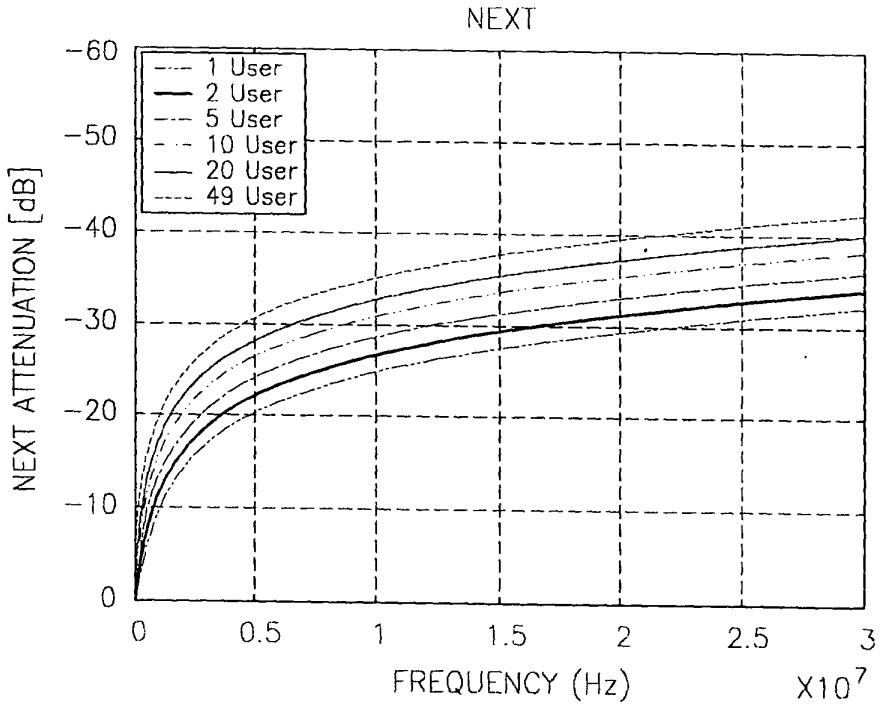

NEXT
1 User
2 User
5 User
10 User
20 User
49 User
NEXT ATTENUATION [dB]
-60
-50
-40
-30
-20
-10
0
0
0.5
1
1.5
2
2.5
3
FREQUENCY (Hz)
X10^7

FIG. 10

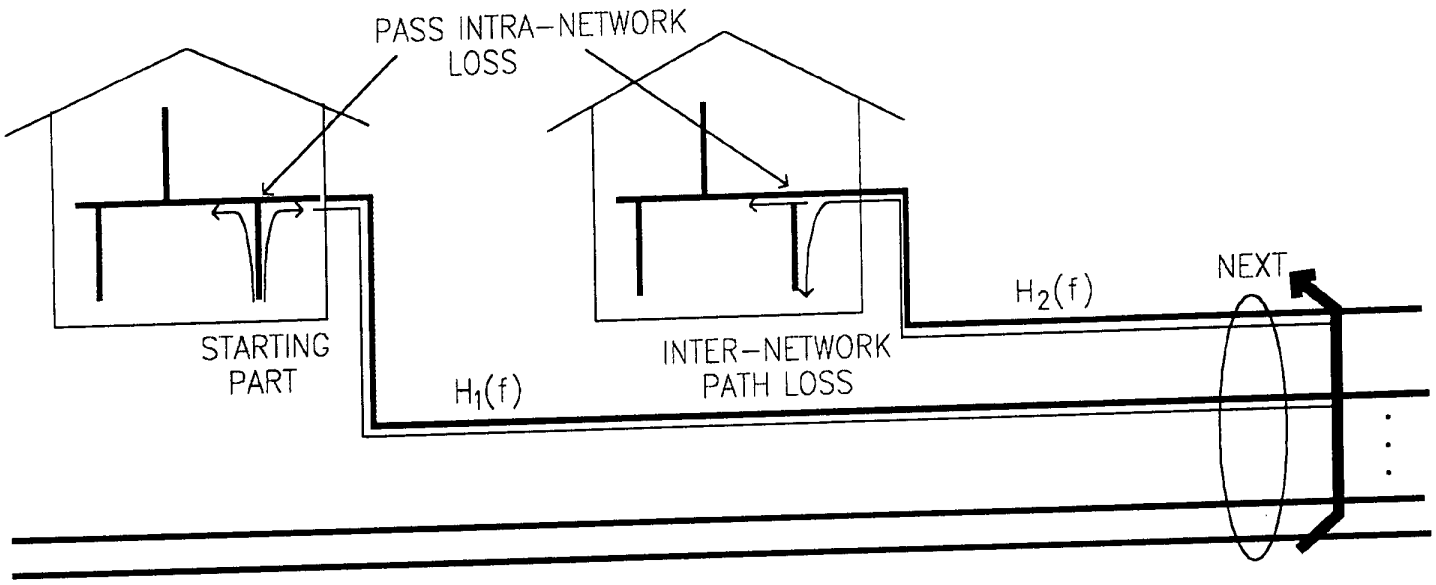

PASS INTRA-NETWORK
LOSS
STARTING
PART
$H_1(f)$
INTER-NETWORK
PATH LOSS
$H_2(f)$
NEXT

FIG. 11

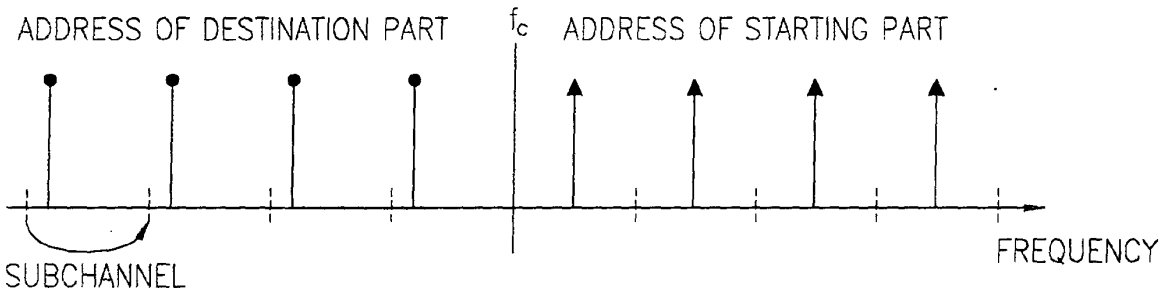

ADDRESS OF DESTINATION PART
$f_c$
ADDRESS OF STARTING PART
SUBCHANNEL
FREQUENCY

FIG. 12

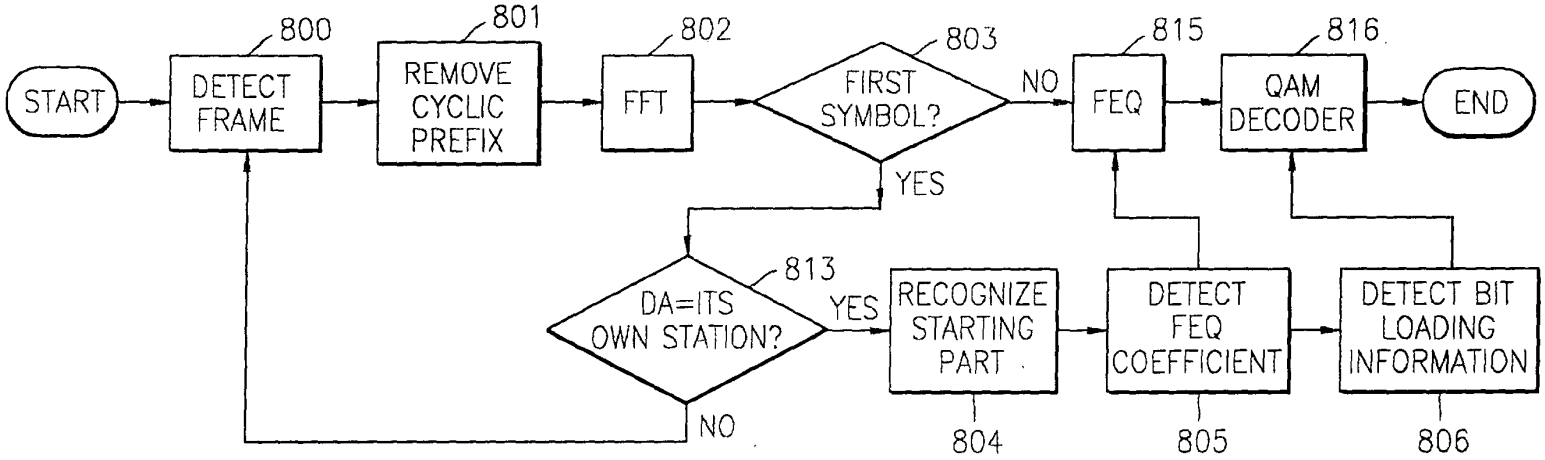

START
DETECT FRAME
800
REMOVE CYCLIC PREFIX
801
FFT
802
FIRST SYMBOL?
803
NO
FEQ
815
QAM DECODER
816
END
YES
DA=ITS OWN STATION?
813
YES
NO
RECOGNIZE STARTING PART
804
DETECT FEQ COEFFICIENT
805
DETECT BIT LOADING INFORMATION
806

FIG. 13

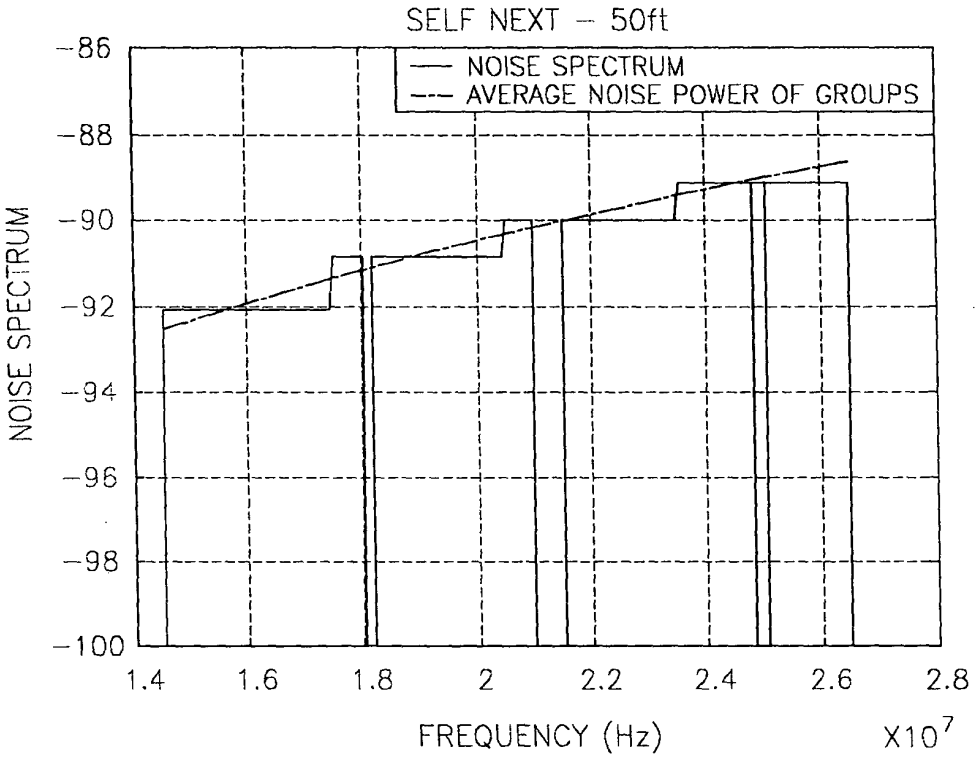

SELF NEXT – 50ft
NOISE SPECTRUM
AVERAGE NOISE POWER OF GROUPS
NOISE SPECTRUM
-86
-88
-90
-92
-94
-96
-98
-100
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
FREQUENCY (Hz)
X10^7

FIG. 14

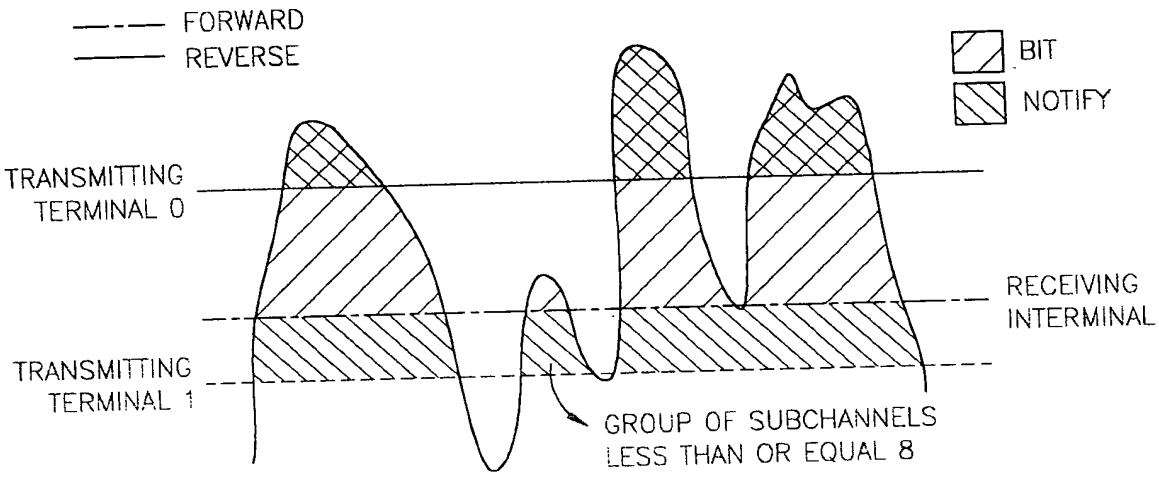
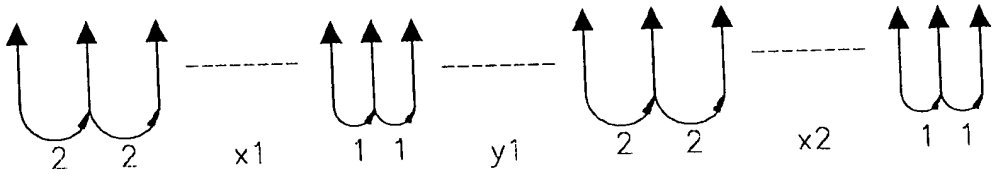

FORWARD
REVERSE
BIT
NOTIFY
TRANSMITTING TERMINAL 0
TRANSMITTING TERMINAL 1
RECEIVING INTERMINAL
GROUP OF SUBCHANNELS LESS THAN OR EQUAL 8

FIG. 15


2 2
x1
1 1
y1
2 2
x2
1 1